SEACAT Profiler CTD

SBE 19*plus* V2

The SBE 19*plus* **V2** (Version 2) Seacat Profiler CTD measures conductivity, temperature, and pressure (depth) and provides high accuracy and resolution, reliability, and ease-of-use for a wide range of research, monitoring, and engineering applications. The pump-controlled, T-C ducted flow configuration minimizes salinity spiking caused by ship heave and allows for slow descent rates without slowing sensor responses, improving dynamic accuracy and resolving small scale structure in the water column. The V2 is the most versatile successor in the line of *Personal CTDs* begun with the original SBE 19 SEACAT in 1987.

Compared to the previous 19*plus*, the 19*plus* V2 incorporates an electronics upgrade and additional features. The V2 has two additional (6 total) auxiliary A/D input channels, FLASH memory is increased from 8 to 64 MB, and one RS-232 data input channel is added. An optional Digiquartz® pressure sensor provides highest-accuracy pressure measurement. Data can be output in XML as well as ASCII and HEX formats. Firmware upgrades can be downloaded through the communications port by the user, without opening the instrument.

The 19*plus* V2 samples continuously at up to 4 scans per second (4 Hz) (2 Hz with Digiquartz®), is battery-powered and self-recording, and is commonly used in the field without a computer, recording up to 1000 individual profiles. Data can be uploaded to a PC and processed later, or can typically be transmitted in real time more than 100 meters to a PC for acquisition and display using SEASOFT software provided (maximum cable length is dependent on the number of auxiliary sensors, sampling rate, baud rate, and cable properties). The 19*plus* V2 can supply power to 7 external sensors and log their outputs with each CTD scan. Nine D-size alkaline batteries provide up to 60 hours of continuous operation when logging C, T, and P at 4 Hz (operation time is shorter if powering auxiliary sensors).

The 19*plus* V2 is easily integrated with an SBE 32 Carousel Water Sampler and is ideal for integration with the SBE 55 ECO Water Sampler. Both real-time and autonomous *auto-fire* operations are possible with any Sea-Bird CTD / Water Sampler system.

The 19*plus* V2 can operate in moored mode, recording time series measurements at user-programmable intervals. Moored mode is easily configured using setup commands and by removing the profiling T-C Duct and installing optional anti-fouling devices. (If profiling is not needed, the 16*plus* V2 Seacat Recorder offers greater moored-mode programming flexibility and a pressure sensor is optional.)

Accuracy, convenience, portability, software, and support: compelling reasons why the 19*plus* V2 is today's best low-cost CTD.

CONFIGURATION, OPTIONS, AND ACCESSORIES

A standard SBE 19*plus* V2 is supplied with:
- Plastic housing for depths to 600 meters
- Strain-gauge pressure sensor
- 64 Mbyte FLASH RAM memory
- 9 D-size alkaline batteries
- Glass-reinforced epoxy bulkhead connectors
- SBE 5M miniature pump with plastic housing for depths to 600 m, and T-C Duct

Options and accessories include:
- Titanium housing for depths to 7000 meters
- Wet-pluggable MCBH series connectors
- SBE 5M miniature pump with titanium housing for 7000 meters
- SBE 5P (plastic) or 5T (titanium) in place of SBE 5M for use with dissolved oxygen and/or other pumped sensors
- Digiquartz® pressure sensor
- Stainless steel protection cage
- Auxiliary sensors for Dissolved Oxygen, pH (Profiling mode only), fluorescence, radiance (PAR), light transmission, and optical backscatter (turbidity)
- Plastic shipping case
- Nickel Metal Hydride (NiMH) batteries and charger
- Moored mode conversion kit with anti-foulant device fittings
- Load-bearing underwater cables for hand-hauled, real-time profiling
- SBE 36 CTD Deck Unit and Power/Data Interface Module (PDIM) for real-time operation on single-core armored cable up to 10,000 meters

Shown with optional cage, SBE 5P pump, & SBE 43 DO sensor

SOFTWARE

The SBE 19*plus* V2 is supplied with a powerful Windows 2000/XP software package, SEASOFT©-Win32, which includes programs for communication and data retrieval, real-time data acquisition and display, and data processing (filtering, aligning, averaging) and plotting.

SBE
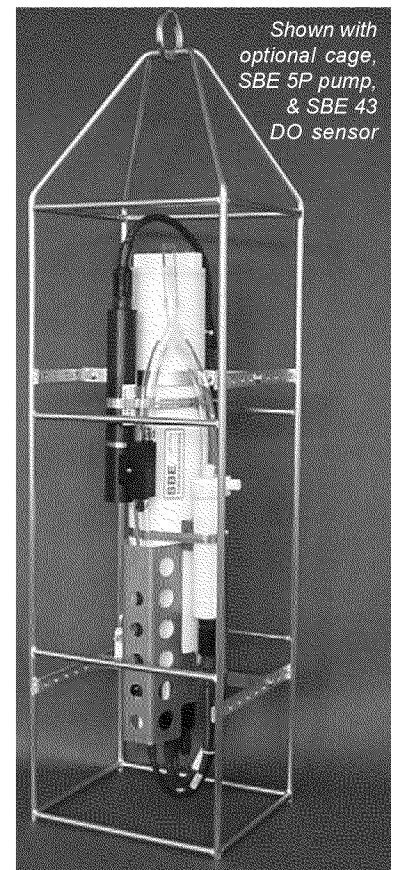
Sea-Bird Electronics, Inc.
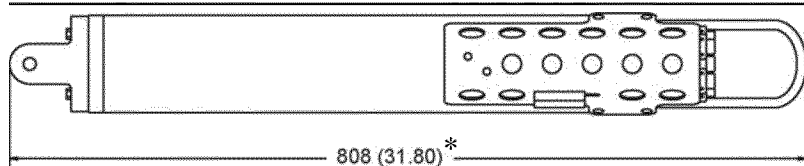1808 136th Place NE, Bellevue, Washington 98005 USA
Website: http://www.seabird.com

E-mail: seabird@seabird.com
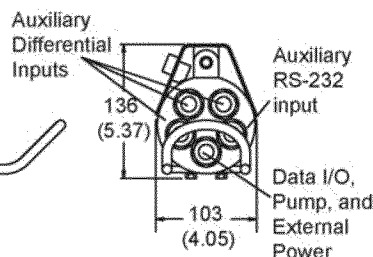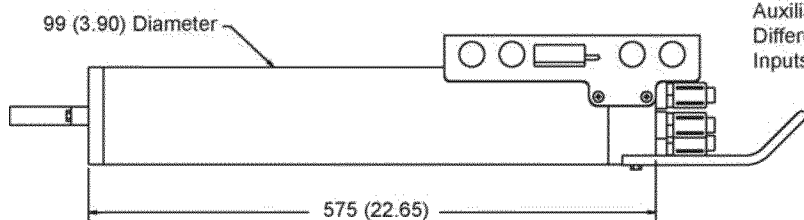Telephone: (425) 643-9866
Fax: (425) 643-9954

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*Note: 19*plus* V2 with optional Quartz pressure sensor is 190 mm (7.5 inches) longer than shown in drawing.

808 (31.80)*

99 (3.90) Diameter

Auxiliary Differential Inputs

Auxiliary RS-232 input

Dimensions in millimeters (inches)

136 (5.37)

Data I/O, Pump, and External Power

575 (22.65)

103 (4.05)

	Measurement Range	Initial Accuracy	Typical Stability	Resolution
Conductivity (S/m)	0 to 9	0.0005	0.0003/month	0.00005 (most oceanic waters; resolves 0.4 ppm in salinity) 0.00007 S/m (high salinity waters; resolves 0.4 ppm in salinity) 0.00001 S/m (fresh waters; resolves 0.1 ppm in salinity)
Temperature (°C)	-5 to +35	0.005	0.0002/month	0.0001
Pressure - *Strain Gauge*	0 to 20/100/350/600/ 1000/2000/3500/ 7000 meters	0.1% of full scale range	0.1% of full scale range/year	0.002% of full scale range
Pressure - *Quartz*	0 to 20/60/130/200/ 270/680/1400/ 2000/4200/7000/ 10,500 meters	0.02% of full scale range	0.025% of full scale range/year	0.0025% of full scale range

Memory   64 Mbyte non-volatile FLASH memory

Data Storage

Recorded Parameter	Bytes/Sample
T + C	6
pressure - *strain gauge* or *Quartz*	5
each external voltage	2
auxiliary RS-232 sensor	sensor dependent

Real-Time Clock   32,768 Hz TCXO accurate to ±1 minute/year

Internal Batteries   9 alkaline D-cells (Duracell MN1300, LR20) provide 60 hours profiling; optional 9-cell NiMH battery pack provides 40 hours profiling per charge; optional 9-cell Ni-Cad battery pack provides 24 hours profiling per charge

External Power Supply   9 - 28 VDC; consult factory for required current

Power Requirements
Sampling   70 mA
Pump   SBE 5M: 100 mA   Optional SBE 5T or 5P: 150 mA
Communications   65 mA
Quiescent   20 µA

Auxiliary Sensors
Auxiliary power out   up to 500 mA at 10.5 - 11 VDC
Voltage sensor A/D resolution   14 bits
Voltage sensor input range   0 - 5 VDC

Housing Materials, Depth Rating, Weight in air*, Weight in water*
Acetal Copolymer *Plastic* housing, 600 m (1950 ft), 7.3 kg (16 lbs), 2.3 kg (5 lbs)
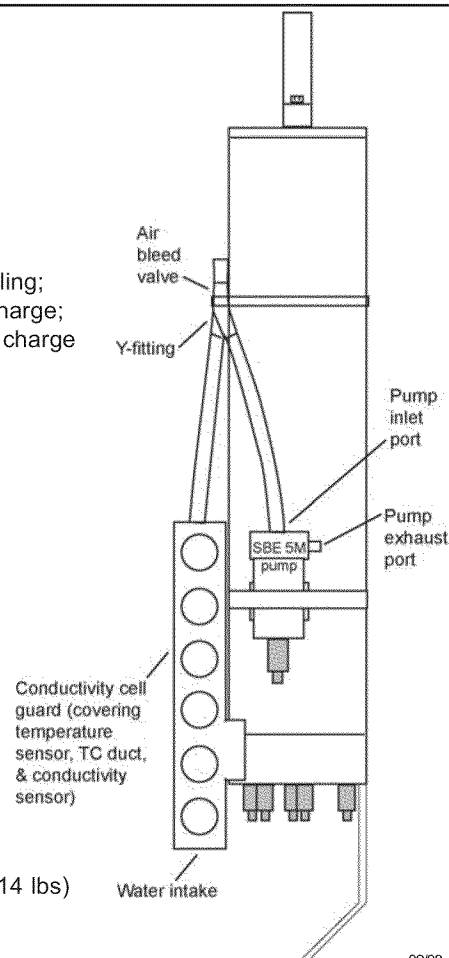3AL-2.5V *Titanium* housing, 7000 m (22,900 ft), 13.7 kg (30 lbs), 8.6 kg (19 lbs)
*Weights listed are without pump; pump adds (in air) 0.3 to 0.7 kg (0.6 to 1.5 lbs), depending on pump model selected. See pump brochures for details.

Optional Cage
(for 19*plus* V2 with strain-gauge pressure) 1016 x 241 x 279 mm (40 x 9.5 x 11 in.), 6.3 kg (14 lbs)
(for 19*plus* V2 with Digiquartz pressure) 1219 x 241 x 279 mm (48 x 9.5 x 11 in.)

Air bleed valve

Y-fitting

Pump inlet port

Pump exhaust port

SBE 5M pump

Conductivity cell guard (covering temperature sensor, TC duct, & conductivity sensor)

Water intake

02/08